Listing of Claims

1. (Original) A transformed cell comprising beta-alanine/pyruvate aminotransferase activity, wherein the cell comprises an exogenous nucleic acid molecule encoding a beta-alanine/pyruvate aminotransferase, and wherein the cell produces 3-hydroxypropionic acid (3-HP) from beta-alanine.

2. (Original) The transformed cell of claim 1, wherein the exogenous nucleic acid molecule encoding the beta-alanine/pyruvate aminotransferase comprises a sequence having at least 90% sequence identity to SEQ ID NO: 17 or 19.

3. (Original) The transformed cell of claim 1, wherein the exogenous nucleic acid molecule encoding the beta-alanine/pyruvate aminotransferase comprises SEQ ID NO: 17 or 19.

4. (Original) The transformed cell of claim 1, wherein the beta-alanine/pyruvate aminotransferase comprises a sequence having at least 90% sequence identity to SEQ ID NO: 18 or 20.

5. (Original) The transformed cell of claim 1, wherein the cell further comprises dehydrogenase activity capable of converting malonate semialdehyde to 3-HP.

6. (Original) The transformed cell of claim 5, wherein the cell further comprises an exogenous nucleic acid molecule encoding a dehydrogenase capable of converting malonate semialdehyde to 3-HP.

7. (Original) The transformed cell of claim 6, wherein the dehydrogenase is a 3-hydroxypropionate dehydrogenase.

8. (Original) The transformed cell of claim 7, wherein the exogenous nucleic acid molecule encoding the 3-hydroxypropionate dehydrogenase comprises a sequence having at least 90% sequence identity to SEQ ID NO: 27.

9. (Original) The transformed cell of claim 8, wherein the exogenous nucleic acid molecule encoding the 3-hydroxypropionate dehydrogenase comprises SEQ ID NO: 27.

10. (Original) The transformed cell of claim 7, wherein the 3-hydroxypropionate dehydrogenase comprises SEQ ID NO: 28.

11. (Previously Presented) The transformed cell of claim 1, wherein the cell further comprises alanine 2,3-aminomutase activity.

12. (Original) The transformed cell of claim 11, wherein the cell further comprises an exogenous nucleic acid molecule encoding an alanine 2,3-aminomutase.

13. (Original) The transformed cell of claim 12, wherein the exogenous nucleic acid molecule that encodes an alanine 2,3-aminomutase comprises a sequence having at least 90% sequence identity to SEQ ID NO: 21, 23 or 25.

14. (Original) The transformed cell of claim 13, wherein the exogenous nucleic acid molecule that encodes an alanine 2,3-aminomutase comprises SEQ ID NO: 21, 23 or 25.

15. (Original) The transformed cell of claim 12, wherein the alanine 2,3-aminomutase comprises SEQ ID NO: 22, 24 or 26.

16. (Original) The transformed cell of claim 1, wherein the cell is a prokaryotic cell.

17. (Original) The transformed cell of claim 16, wherein the prokaryotic cell is a *Lactobacillus*, *Lactococcus*, *Bacillus*, or *Escherichia* cell.

18. (Original) The transformed cell of claim 1, wherein the cell is a yeast cell, plant cell, or fungal cell.

19. (Original) A plant comprising the transformed plant cell of claim 18.

20. (Previously Presented) The transformed cell of claim 1, wherein the cell further comprises lipase or esterase activity, or a combination thereof.

21. (Original) The transformed cell of claim 20, wherein the cell further comprises an exogenous nucleic acid molecule encoding a lipase or an esterase.

22. (Original) The transformed cell of claim 1, wherein the cell further comprises:
3-hydroxypropionate dehydrogenase activity;
alanine 2, 3-aminomutase activity; and
lipase or esterase activity.

23. (Previously Presented) The transformed cell of claim 20, wherein the transformed cell produces an ester of 3-HP.

24. (Original) The cell of claim 23, wherein the ester of 3-HP is methyl 3-hydroxypropionate, ethyl 3-hydroxypropionate, propyl 3-hydroxypropionate, butyl 3-hydroxypropionate, or 2-ethylhexyl 3-hydroxypropionate.

25. (Previously Presented) The transformed cell of claim 1, wherein the cell further comprises aldehyde dehydrogenase activity and alcohol dehydrogenase activity.

26. (Original) The transformed cell of claim 25 wherein the cell further comprises an exogenous nucleic acid molecule encoding an aldehyde dehydrogenase and an exogenous nucleic acid molecule encoding an alcohol dehydrogenase.

27. (Original) The transformed cell of claim 1, wherein the cell further comprises:
3-hydroxypropionate dehydrogenase activity;
alanine 2, 3-aminomutase activity;
aldehyde dehydrogenase activity; and
alcohol dehydrogenase activity.

28. (Previously Presented) The transformed cell of claim 25 , wherein the transformed cell produces 1,3-propanediol.

29. (Previously Presented) The transformed cell of claim 1, wherein the cell further comprises esterase activity.

30. (Original) The transformed cell of claim 29, wherein the cell further comprises an exogenous nucleic acid molecule encoding an esterase.

31. (Original) The transformed cell of claim 1, wherein the cell further comprises:
3-hydroxypropionate dehydrogenase activity;
alanine 2, 3-aminomutase activity; and
esterase activity.

32. (Previously Presented) The transformed cell of claim 29, wherein the transformed cell produces polymerized 3-HP.

33. (Previously Presented) A method for making 3-HP from beta-alanine, comprising culturing the transformed cell of claim 1 under conditions that allow the transformed cell to make 3-HP from beta-alanine.

34. (Original) The method of claim 33, wherein the transformed cell further comprises an exogenous nucleic acid molecule encoding an alanine 2,3-aminomutase, wherein the alanine 2,3-aminomutase is capable of producing beta-alanine from alpha-alanine.

35. (Original) The method of claim 33, wherein the cell is a prokaryotic cell.

36. (Previously Presented) A method of producing an ester of 3-HP, comprising culturing the transformed cell of claim 20 under conditions wherein the transformed cell produces an ester of 3-HP.

37. (Original) The method of claim 36, wherein the ester of 3-HP is methyl 3-hydroxypropionate, ethyl 3-hydroxypropionate, propyl 3-hydroxypropionate, butyl 3-hydroxypropionate, or 2-ethylhexyl 3-hydroxypropionate.

38. (Previously Presented) A method of producing 1,3 propanediol, comprising culturing the transformed cell of claim 25 under conditions wherein the transformed cell produces 1,3 propanediol.

39. (Previously Presented) A method of producing polymerized 3-HP, comprising culturing the transformed cell of claim 29 under conditions wherein the transformed cell produces polymerized 3-HP.

40. (Original) A method for making 3-HP, comprising:

transfecting the transformed cell of claim 1 with a nucleic acid molecule encoding a polypeptide comprising alanine 2,3-aminomutase activity; and

culturing the transfected cell to allow the transfected cell to make 3-HP.

41. (Original) A transformed cell comprising:

endogenous beta-alanine/pyruvate aminotransferase activity; and

an exogenous nucleic acid molecule encoding an alanine 2,3, aminomutase, wherein the cell produces 3-HP.

42. (Original) A recombinant nucleic acid comprising:

a nucleic acid molecule encoding a beta-alanine/pyruvate aminotransferase; and

a nucleic acid molecule encoding a dehydrogenase capable of converting malonate semialdehyde to 3-HP.

43. (Original) The recombinant nucleic acid of claim 42, wherein the dehydrogenase is a 3-hydroxypropionate dehydrogenase.

44. (Original) The recombinant nucleic acid of claim 42, further comprising a nucleic acid molecule that encodes an alanine 2,3-aminomutase.

45. (Original) The recombinant nucleic acid of claim 42 operably linked to a promoter sequence.

46. (Original) A vector comprising the recombinant nucleic acid of claim 42.

47. (Original) A cell transformed with the recombinant nucleic acid of claim 42.

48. (Original) A transgenic plant comprising the recombinant nucleic acid of claim 42.

49. (Original) A transformed cell comprising at least one exogenous nucleic acid molecule, wherein the at least one exogenous nucleic acid molecule comprises the recombinant nucleic acid of claim 42.

50. (Original) The transformed cell of claim 49 wherein the cell produces 3-HP from beta-alanine.

51. (Original) An isolated peptide comprising alanine 2,3 aminomutase activity, wherein the peptide comprises a sequence having at least 90% sequence identity to SEQ ID NO: 22.

52. (Original) The peptide of claim 51, wherein the peptide comprises one or more conservative amino acid substitutions.

53. (Original) The peptide of claim 52, wherein the peptide comprises 1-10 conservative amino acid substitutions.

54. (Original) An isolated nucleic acid molecule comprising a nucleic acid molecule that encodes the peptide of claim 51.

55. (Original) The isolated nucleic acid molecule of claim 54, operably linked to a promoter sequence.

56. (Original) The isolated nucleic acid molecule of claim 54, wherein the nucleic acid molecule comprises a sequence having at least 90% sequence identity to SEQ ID NO: 21.

57. (Original) The isolated nucleic acid molecule of claim 56, wherein the nucleic acid molecule includes one or more substitutions which results in one or more conservative amino acid substitutions.

58. (Original) The isolated nucleic acid molecule of claim 56, wherein the nucleic acid molecule includes one or more substitutions which results in no more than 10 conservative amino acid substitutions.

59. (Original) A vector comprising the isolated nucleic acid of claim 54.

60. (Original) A recombinant nucleic acid molecule comprising the isolated nucleic acid molecule of claim 54.

61. (Original) A cell transformed with the recombinant nucleic acid molecule of claim 60.

62. (Original) A transformed cell comprising at least one exogenous nucleic acid molecule, wherein the at least one exogenous nucleic acid molecule comprises a nucleic acid sequence encoding the peptide of claim 51.

63. (Original) The transformed cell of claim 62, wherein the cell produces beta-alanine from alpha-alanine.

64. (Original) The cell of claim 62, wherein the cell produces 3-HP.

65. (Original) The cell of claim 62, wherein the cell produces 1,3-propanediol, an ester of 3-HP or polymerized 3-HP.